

**Study Guide**

For use with pages 16–21

**GOAL** Use order of operations to evaluate expressions.**ORDER OF OPERATIONS**

1. Evaluate expressions inside grouping symbols. (Parentheses, brackets, and fraction bars are common grouping symbols.)
2. Evaluate powers.
3. Multiply and divide from left to right.
4. Add and subtract from left to right.

**EXAMPLE 1** Using Grouping Symbols

Evaluate the expression.

$$\begin{aligned} \text{a. } 12 \cdot 3 - 18 \div 6 &= 36 - 3 \\ &= 33 \end{aligned}$$

Multiply and divide.  
Subtract.

$$\begin{aligned} \text{b. } 9(10.6 + 7.3) &= 9(17.9) \\ &= 161.1 \end{aligned}$$

Add within parentheses.  
Multiply.

$$\begin{aligned} \text{c. } \frac{55.4 - 18.5}{2.6 + 0.4} &= (55.4 - 18.5) \div (2.6 + 0.4) \\ &= 36.9 \div 3 \\ &= 12.3 \end{aligned}$$

Rewrite fraction as division.  
Evaluate within parentheses.  
Divide.

**EXAMPLE 2** Evaluating Variable ExpressionsEvaluate the expression  $3(x - y)^2$  when  $x = 7$  and  $y = 3$ .**Solution**

$$\begin{aligned} 3(x - y)^2 &= 3(7 - 3)^2 \\ &= 3(4)^2 \\ &= 3(16) \\ &= 48 \end{aligned}$$

Substitute 7 for  $x$  and 3 for  $y$ .  
Subtract within parentheses.  
Evaluate power.  
Multiply.

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**Exercises for Examples 1 and 2**

Evaluate the expression.

1.  $6 + (25 - 16)^2$

2.  $66 \div [(12 + 6) \div 9]$

3.  $\frac{4(10 - 2)}{3^2 + 7}$

Evaluate the expression when  $x = 5$  and  $y = 7$ .

4.  $7(y + x)$

5.  $4x - 2y$

6.  $\frac{2.3x}{y - 2}$

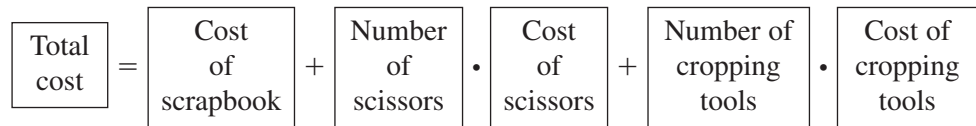
**EXAMPLE 3 Using a Problem Solving Plan**

To start your scrapbook hobby, you bought a scrapbook for \$19.99, 2 scissors for \$5.50 each, and 3 cropping tools for \$8.25 each. Find the total cost.

**Solution**

**Read and Understand** You buy several tools and one scrapbook. You are asked to find the total cost.

**Make a Plan** Write a verbal model.



**Solve the Problem** Write and evaluate an expression.

Total cost = $19.99 + 2 \cdot 5.5 + 3 \cdot 8.25$	Substitute values into verbal model.
$= 19.99 + 11 + 24.75$	Multiply.
$= 55.74$	Add.

**Answer:** The total cost is \$55.74.

**Look Back** Use estimation to check that the answer is reasonable.

**Exercise for Example 3**

7. You buy 3 shirts for \$12.99 each and 2 pairs of pants for \$24.99 each. Find the total cost.